OPERATING MANUAL

PR-40A
THERMAL PRINTER

Telecommunications
Techniques
Corporation

. . . EXPECT EXCELLENCE

A DYNATECH COMPANY

ML10968
REV. B

PR-40A THERMAL PRINTER

OPERATING MANUAL

JULY 1992

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GENERAL INFORMATION

1.1 INTRODUCTION

This operating manual contains information required to install and operate Telecommunications Techniques Corporation's (TTC) PR-40A Thermal Printer. Specifically included in this manual are a description of the printer, installation instructions, operating procedures, specifications, and service and warranty information.

1.2 INSTRUMENT OVERVIEW

The PR-40A is an alphanumeric and graphics printer utilizing thermal dot matrix printing. The PR-40A features user-selectable 40- and 80-column printing in a compact portable unit. It can be powered by a built-in nickel cadmium battery or through an AC adaptor. The PR-40A measures 2.2" H x 9.3" W x 6.3" D and weighs only 2.1 pounds.

SETTING UP THE PR-40A THERMAL PRINTER

2.1 INTRODUCTION

This section includes information on unpacking and inspecting the PR-40A and making the proper power connections. It also contains a description of the controls, procedures for loading the printer with paper, and instructions for setting the DIP switches.

2.2 UNPACKING

The shipping container housing the PR-40A should be inspected for damage when it is received. If the shipping container or shipping material has been damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked for proper operation. Set-up instructions are given later in this section, and a checklist for resolving routine operational difficulties is included in Section 4. If the contents of the shipment are incomplete, or if the PR-40A fails to operate properly, notify TTC. If the shipping container is damaged, notify the carrier as well as TTC, and keep the shipping container and materials for the carrier's inspection.

2.3 EQUIPMENT INCLUDED

The following is a list of parts that should be present when the PR-40A is unpacked.

- PR-40A Thermal Printer
- AC Adaptor
- Thermal Printer Paper (1 roll) (10966)
- Carrying Case (40831)
- Connection Cable (30511)
- PR-40A Operating Manual (ML10968)

2.4 POWER REQUIREMENTS

The PR-40A may be powered either by the AC adaptor (included) or the built-in nickel cadmium battery.

2.4.1 AC Adaptor Operation

When operated with the AC adaptor, the PR-40A requires an uninterrupted source of 120 VAC power. The DC plug on the AC adaptor inserts into a power jack on the printer's rear panel.

CAUTION: Do not use an AC adaptor other than the one supplied with the PR-40A. Using a different, and possibly incorrect, adaptor may damage the PR-40A or cause it to malfunction.

2.4.2 Battery Operation

The PR-40A's built-in nickel cadmium battery allows the printing of approximately 1500 character lines before recharging is needed. Since the battery may not be fully charged when the PR-40A is shipped, it should be recharged when received. The battery can be recharged by turning the printer off and plugging in the AC adaptor for approximately ten hours. The battery should not be recharged for more than 24 hours at a time, since doing so may adversely affect printer performance or damage the printer. The battery should always be recharged before storing the printer.

If the PR-40A loses battery power while printing, it automatically goes off-line. Any data being transmitted at the time of power loss is retained in the buffer memory, and the green On Line LED flashes to signal the presence of such data. The data in the buffer memory can be printed by plugging in the AC adaptor and placing the PR-40A back on-line. Data should not be left in the buffer memory for any length of time after battery power is lost.

2.5 INSTRUMENT DESCRIPTION

Figures 2-1 through 2-3 identify the controls, parts, and accessories of the PR-40A. The PR-40A's controls are located on the top panel of the

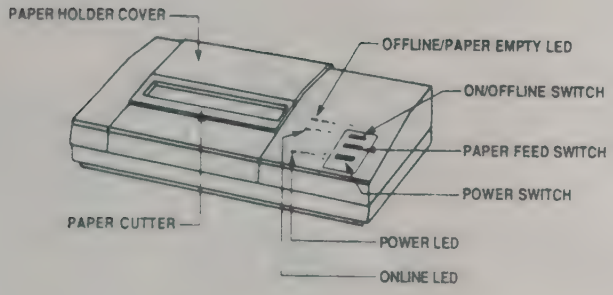

Figure 2-1
PR-40A Top Panel

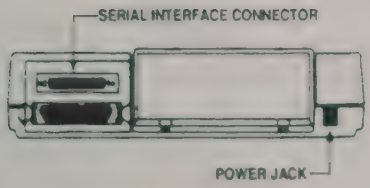

Figure 2-2
PR-40A Rear Panel

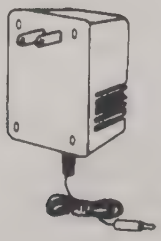

Figure 2-3
AC Adaptor

printer. The **POWER** switch applies power to and removes power from the printer, the switch slides up or down to the appropriate position. The Power LED illuminates when power is applied. Pressing the **ON LINE** switch sets the printer on-line, and the adjacent green On Line LED illuminates. Pressing the switch again takes the printer off-line, and the red Off Line/ Paper End LED illuminates. The Off Line/Paper End LED flashes when the paper is near the end of the roll or has run out. The **FEED** switch, when pressed, causes the paper to feed continuously; this switch is operational only when the Off Line/Paper Empty LED is illuminated or is flashing.

2.6 LOADING PAPER

The thermal paper supplied with the PR-40A should be stored away from heat, moisture, and light. To prevent discoloration, the paper should not come in contact with vinyl chloride film or organic solvents. Only water solvent, starch, or composite glues should be used with the paper. The following procedure contains instructions for loading the PR-40A with paper. The printer should never be allowed to print without paper.

NOTE: Use only the printer paper (Part Number 10966) supplied with the PR-40A. Use of incorrect paper may cause poor printing or printer malfunction.

1. Open the paper cover on the top panel by pressing slightly on the clear plastic cover to unlatch it. Then swing the cover on its hinge toward the back of the printer to expose the paper roll.

2. Cut the paper to be threaded into the printer into a squared V-shape. A jagged paper edge may make loading difficult.

3. As shown in Figure 2-4, insert the end of the paper in the direction of the arrow, and press and hold the **FEED** switch until the paper flows smoothly out the front of the printer mechanism. The paper should never be pulled backwards out of the printer.

   NOTE: Since only the outside of the paper roll is coated with a heat sensitive agent for printing, the coated (outside) side of the paper should be facing down when the paper edge is first inserted into the printer.

   Always use the **FEED** switch to feed out the paper. If the paper is pulled out by hand, it must be fed one line with the **FEED** switch before printing begins.

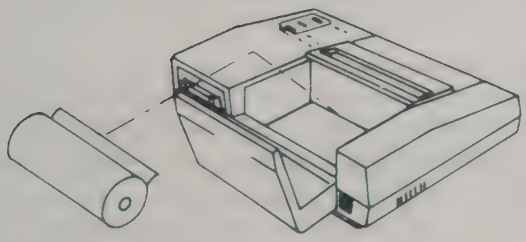

Figure 2-4
Loading Printer Paper

4. Pull the excess paper forward across the paper cutter to neatly tear it off the printer.

5. Close the paper cover and latch it shut by pressing down slightly.

2.7 PRINTER SELF-TEST

The PR-40A has a self-test function to ensure print quality. The self-test is enabled by setting the **POWER** switch to the ON position while simultaneously pressing and holding the **FEED** switch. During the self-test, the PR-40A prints one set of all characters in condensed, ordinary, and double-width formats, followed by several lines of checkered characters. The printing self-test ends automatically.

2.8 CABLE CONNECTION

A cable (Part Number 30511) is provided for connecting the PR-40A to any TTC test set via the serial interface. Pin assignments and descriptions for the serial interface are given in Section 3, Specifications. In addition, the PR-40A has a parallel interface for connection to other equipment. Pin assignments and descriptions for the parallel interface are given in Section 3.

Before connecting the printer to the test set, ensure that neither instrument has power applied. Connect the AC adaptor to the printer and to the power source; then connect the cable from the printer to the test set. It is recommended that power be applied to the test set before the printer is turned on.

2.9 DIP SWITCH SETTINGS

The PR-40A Printer features two sets of DIP switches on its bottom panel that enable the user to select required functions.

NOTE: Power to the PR-40A must be turned off and then turned on again to activate any changes in DIP switch settings.

A set of eight printer control DIP switches determine the input data format, the number of columns desired, and the character selection Table 2-1 provides the settings for these DIP switches and indicates the factory-set default positions.

Table 2-1
Printer Control DIP Switches

Switch	Function	ON	OFF
SW1	Input data format	Parallel	Serial*
SW2	Auto Line Feed	Enabled*	Disabled
SW3	No. of columns/line	40*	80
SW4	Character selection	Regular	Special*
SW5	Zero form selection	0	ø*

International Characters								
	Japanese	USA	German	English	French	Spanish	Italian	Swedish
SW6	ON	OFF*	ON	OFF	ON	OFF	ON	OFF
SW7	ON	ON*	OFF	OFF	ON	ON	OFF	OFF
SW8	ON	ON*	ON	ON	OFF	OFF	OFF	OFF

* Indicates the factory-set position of each of the DIP switches.

A second set of six DIP switches determine the serial RS-232 port configuration. They include character length, parity, and baud rate. Settings for these switches are shown in Table 2-2. These are the settings for the most common applications using TTC products; however, the RS-232 settings should be double checked with each piece of equipment used.

NOTE: For normal ASCII printing, either 7 or 8 data bits may be used. However, to correctly receive graphics printouts, the printer must be set for 8 data bits.

If the printer is set for 7 data bits, the parity permission should be enabled, otherwise a serial data error will occur.

NOTE: When a framing error occurs, a "?" or a heart character is printed. When a parity error occurs, an "I" or a spade character is printed. When both types of error occur, they are processed as a parity error.

Table 2-2
RS-232 DIP Switches

Switch	Function	ON	OFF
SW1	Data bit length	8 (graphics)*	7
SW2	Parity	Disabled*	Enabled
SW3	Parity selection	Odd	Even*

	Baud Rate (in bps)							
	75	150	300	600	1200	2400*	4800	9600
SW4	ON	ON	ON	ON	OFF	OFF*	OFF	OFF
SW5	ON	ON	OFF	OFF	ON	ON*	OFF	OFF
SW6	ON	OFF	ON	OFF	ON	OFF*	ON	OFF

* Indicates the factory-set position of each of the DIP switches.

SPECIFICATIONS

3.1 INTRODUCTION

This section contains the specifications for the PR-40A Thermal Printer.

3.2 PRINTING SPECIFICATIONS

Printing Method:	Thermal dot matrix.
Printing Speed:	Regular: 37.5 characters/sec. Condensed: 50 characters/sec.
Character Font:	Regular: 9 x 7 dot matrix, 2.47 x 1.88 mm. Condensed: 9 x 7 dot matrix, 2.47 x 0.94 mm.
Character Set:	See Table 3-1.
Number of Columns:	Regular: 40 columns/line. Condensed: 80 columns/line.

3.3 PAPER SPECIFICATIONS

Paper Type:	Heat sensitive roll paper (Part Number 10967).
Paper Size:	4.37" (112 mm) wide, roll diameter 1.9" (48 mm).

Table 3-1
Character Code Table

	0 0000	1 0001	2 0010	3 0011	4 0100	5 0101	6 0110	7 0111
0 0000			SP	ø	@	P	‘	p
1 0001			!	1	A	Q	a	q
2 0010		DC2	“	2	B	R	b	r
3 0011				3	C	S	c	s
4 0100		DC4	$	4	D	T	d	t
5 0101			%	5	E	U	e	u
6 0110			&	6	F	V	f	v
7 0111			‘	7	G	W	g	w
8 1000	BS	CAN	(	8	H	X	h	x
9 1001	HT		)	9	I	Y	i	y
A 1010	LF		*	:	J	Z	j	z
B 1011		ESC	+	;	K	[	k	{
C 1100	FF		,	<	L	\	l	|
D 1101	CR		-	=	M	]	m	}
E 1110	SO		.	>	N	^	n	~
F 1111	SI		/	?	O	—	o	DEL

Codes in the blank sections are ignored.
SP signifies space.

3.4 PHYSICAL SPECIFICATIONS

Dimensions: 2.27" H x 9.36" W x 6.32" D (58.5 mm x 240 mm x 162 mm).

Weight: 2.1 pounds (950 g).

Power: 120 VAC.

Operating Temperature: 32° F to 122° F (0° C to 50° C).

Operating Humidity: 30% to 80%, RH.

Storage Temperature: - 4° F to 140° F (- 20° C to 60° C).

3.5 RS-232C SERIAL INTERFACE

Bit Rate: 75 to 9600 baud, asynchronous.

Bit Length: 7 or 8 data bits.

Parity: Odd, even, or no parity.

Input Signal Polarity:
Data Mark: -3 V to -25 V.
Data Space: +3 V to +25 V.
Control ON: +3 V to +25 V.
Control OFF: -3 V to -25 V.

Handshaking: When the signal condition at Pin 20 (DTR) is:
OFF (Mark) - Data transfer is disabled.
ON (Space) - Data transfer is enabled.

Signal Description and Pin Assignments: See Table 3-2.

Table 3-2
Signal Description and Pin Assignments

Pin	Signal	I/O	Description
1,7	GND	—	Ground.
3	Data	I	Serial data input to the printer.
20	Data Terminal Ready (DTR)	O	ON (Space) when printer is ready to accept data; OFF (Mark) when printer is not ready to accept data.

3.6 PARALLEL INTERFACE

Bit Rate:	75 to 9600 baud, asynchronous.
Bit Length:	8 data bits.
Parity:	No parity.
Handshaking:	When the signal condition at Pin 1 (STROBE) is: High - Data reading is disabled. Low - Data reading is enabled. When the signal condition at Pin 10 (ACK) is: High - Data has not been received. Low - Data has been received. When the signal condition at Pin 11 (BUSY) is: Low - Data can be received. High - Data cannot be received (Busy).
Signal Description and Pin Assignments:	See Table 3-3.

3.7 AC ADAPTOR

Input:	120 V, 60 Hz.
Output:	6 V, 2000 mA.
Current Consumption:	1.5 A.
Dimensions:	3.2" x 2.3" x 1.9" (82 mm x 60 mm x 49 mm).
Weight:	1.1 pound (510 g).

Table 3-3
Parallel Interface Pin Assignments

Pin	Signal	I/O	Description
1	STROBE	I	Data strobe — Low enables data reading (triggered on negative-going edge).
2 to 9	Data 0 to 7	I	Input data — High equals a 1; low equals a 0.
10	ACK	O	Acknowledge signal — Low indicates that data has been received.
11	BUSY	O	Printer busy signal — High indicates printer is busy.
12	PE	O	Paper end signal — High indicates that there is no paper.
13	SLCT	O	Select signal — High indicates that the printer is on-line.
14	AUTO-LF	I	Automatic line feed — Low at power-on means one line feed is performed at carriage return.
15	N/A	—	Not used.
16	GND	—	Ground.
17 & 18	N/A	—	Not used.
19 to 30	GND		Twist, pair, and return ground.
31	INIT	I	Initialize.
32	ERROR	O	Error signal — Low indicates an error exists.
33	GND	—	Ground.
34	N/A	—	Not used.
35 & 36	+5V	—	+5 VDC.

MAINTENANCE AND SERVICE

4.1 INTRODUCTION

This section contains information on resolving routine operational difficulties and TTC's warranty policy.

4.2 MAINTENANCE

If the PR-40A fails to operate properly, check the items listed in Table 4-1 as a guide to resolving the problem. If all of these items have been checked and found to be in correct working order, and the PR-40A still fails to operate properly, contact TTC's Customer Service Department at 800-638-2049.

Table 4-1
Operational Problems and Resolutions

Problem	Resolution
POWER switch is set to the ON position, but the PR-40A fails to operate.	Check to see that the AC adaptor is securely plugged into an uninterrupted 120 VAC power source and that the DC plug of the adaptor is securely plugged into the power jack on the PR-40A's rear panel.
Printer head moves, but nothing is printed.	Check that the paper is correctly loaded so that the coated side of the paper comes in contact with the printer head (see Section 2.6 for instructions on loading the paper).
Printing is light.	Ensure that the paper is the correct type for the PR-40A.
Printer head stops during printing.	Ensure that the paper is properly feeding through the printer and is not jammed inside the printing mechanism.

Table 4-1
Operational Problems and Resolutions (Continued)

Problem	Resolution
	NOTE: Remove power from the PR-40A before attempting to correct a paper jam.
The first printing is doubled.	The paper may have been pulled out by hand rather than advanced with the **FEED** switch after the last printing or loading. Press the **FEED** switch to advance the paper one line to correct this problem.
Printer goes off-line by itself.	The nickel cadmium battery may need to be recharged (see Section 2.4.2 for instructions on battery operation).
Characters other than those in the character code table (Table 3-1) are printed.	Check that the number of data bits, parity setting, and parity enable are set correctly (see Section 2.9 for instructions on setting the DIP switches).

4.3 SERVICE

4.3.1 Warranty Policy

All equipment manufactured by Telecommunications Techniques Corporation (TTC) is warranted against defects in material and workmanship. This warranty applies only to the original purchaser and is non-transferable unless express written authorization of the warranty transfer is granted by TTC.

The PR-40A will be repaired or replaced (at our option) at no charge for the period stated in the warranty after shipment to the customer. Liability under this warranty extends only to the replacement value of the equipment. The warranty is void under the following conditions.

1. Equipment has been altered or repaired without specific authorization from TTC.

2. Equipment is installed or operated other than in accordance with instructions contained in TTC literature and operating manuals.

No other warranty is expressed or implied. TTC is not liable for consequential damages.

4.3.2 In-Warranty Service

Equipment in warranty must be returned to the factory with shipping prepaid. The equipment should be packed and shipped in accordance with instructions in Section 4.3.4 of this manual. Before returning any equipment, the customer must obtain a Return Authorization (RA) number by contacting the TTC Repair Department. The RA number should then appear on all paperwork and be clearly marked on the outside of the shipping container.

After the equipment is repaired by TTC, it will be tested to applicable specifications, burned-in for at least 24 hours, retested, and returned to the customer with shipping prepaid. A brief description of the work performed and the materials used will be provided on the Equipment Repair Report furnished with the returned equipment.

4.3.3 Out-of-Warranty Service

The procedure for repairing out-of-warranty equipment is the same as that used for equipment still in warranty. However, there is a minimum charge applied to each request for out-of-warranty service. The minimum charge guarantees the customer an estimate of the repair costs and is used as credit against actual materials and labor costs should the equipment be repaired. Contact the TTC Repair Department for specific information on the minimum out-of-warranty repair charge.

The customer will be billed for parts plus standard labor rates in effect at the time of repair. The customer will also be required to furnish a purchase order number before repair work can be started, and a hard copy of the

purchase order must be received by TTC before the repaired equipment may be shipped to the customer. A description of the labor and materials used will be provided in the Equipment Repair Report.

Once an out-of-warranty repair is made, the repaired part or component is warranted for 90 days. This warranty applies only to the part or component that was repaired; other parts or components are not covered under the 90-day repair warranty.

4.3.4 Equipment Return Instructions

To all equipment returned for repair, the customer should attach a tag with the following information.

- Owner's name and address.
- A list of the equipment being returned and the applicable serial number(s).
- A detailed description of the problem or service requested.
- The name and telephone number of the person to contact regarding questions about the repair.
- The Return Authorization (RA) number.

If possible, the customer should return the equipment using the original shipping container and material. If the original container is not available, the PR-40A should be carefully packed so that it will not be damaged in transit. TTC is not liable for any damage that may occur during shipping. The customer should clearly mark the TTC-issued RA number on the outside of the package and ship it prepaid and insured to TTC.

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